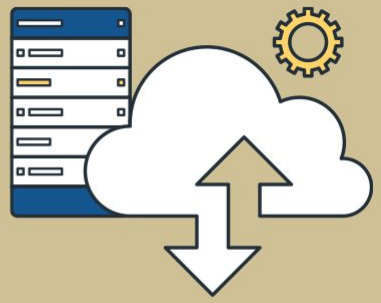
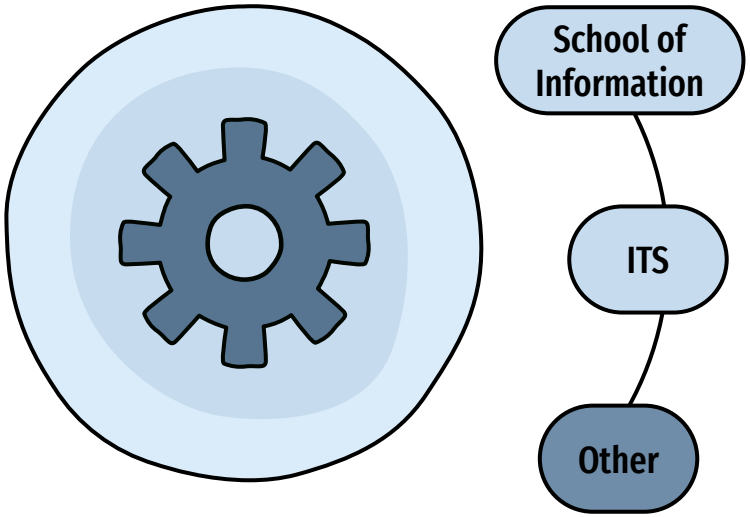
MICHIGAN IT

2021 VIRTUAL HACKS WITH FRIENDS



MAY 7, 14, & 21

Team 16: Instrumenting Education



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Adam Patterson (Student and Research Programmer)

Lance E Sloan (Developer),
Zhen Qian (Developer),
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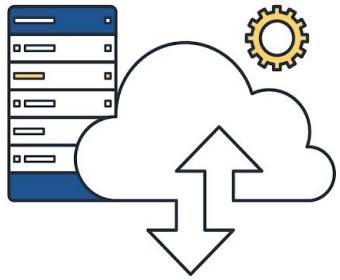


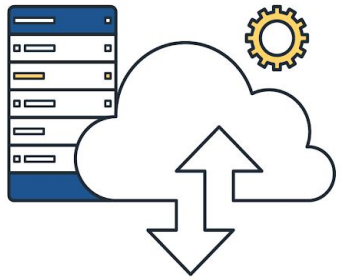
Motivation

Learners practice and develop their data science skills through programming, but we can't see what they write and the problems they face.

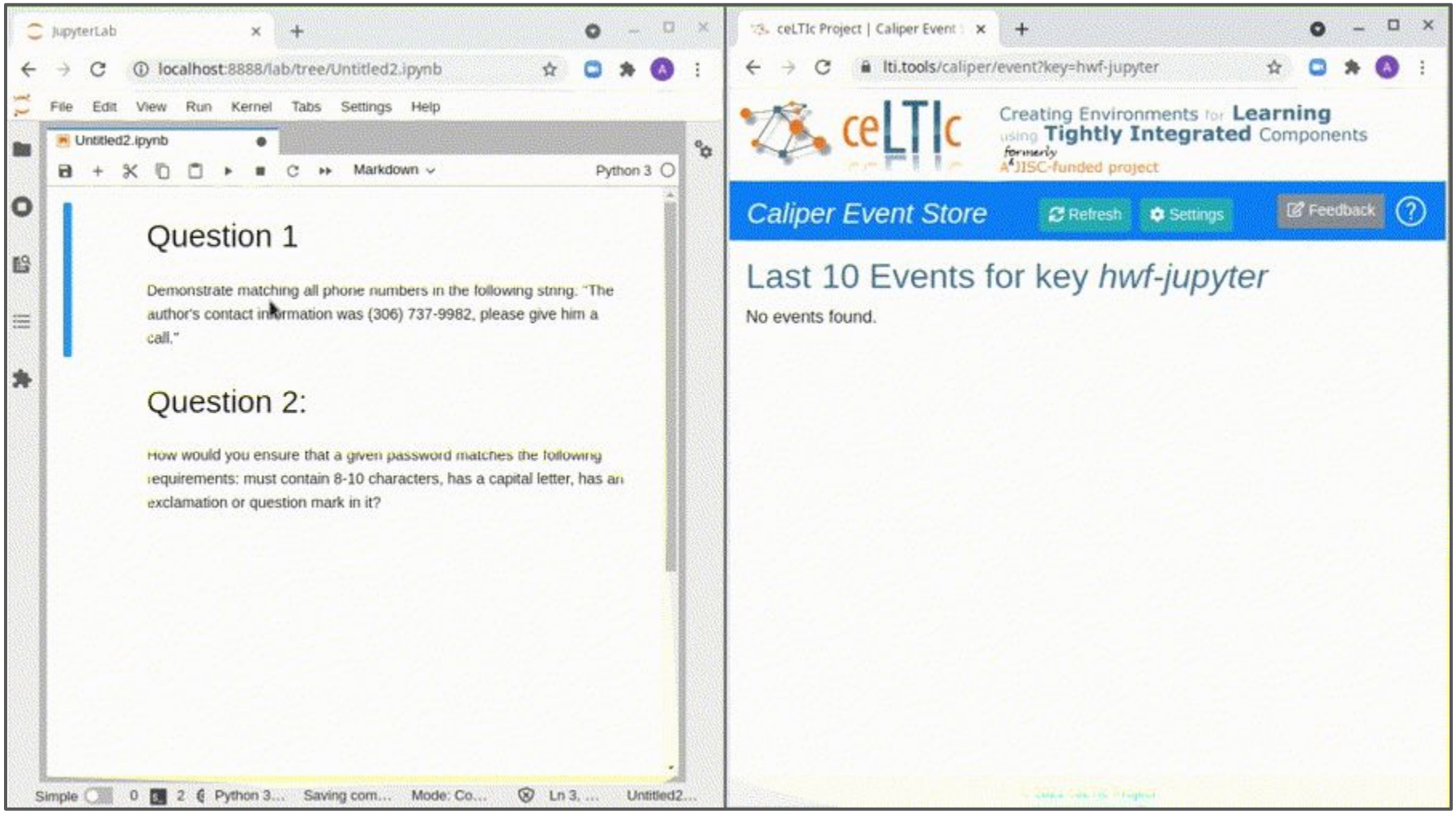
This HWF project is all about changing that for data science education!

We want to enable instructors and researchers to be able to answer questions:

- On which questions are students spending most of their time?
- How many students have begun, or finished a given question or assignment?
- Can we connect students who are working at the same time on similar questions?
- How can an instructor revise an assignment or teaching with knowledge of where students are spending their time and encountering problems?



Our Approach



Contributions

We have both immediate and longer term contributions

Short term (now!):

- https://github.com/educational-technology-collective/hwf-jupyterlab-telemetry

Longer Term:

- **Jupyter** - An open source extension of our work

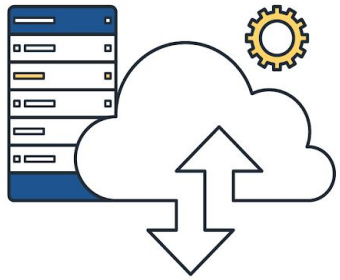
- **Caliper** - A schema for the capture of these learning events

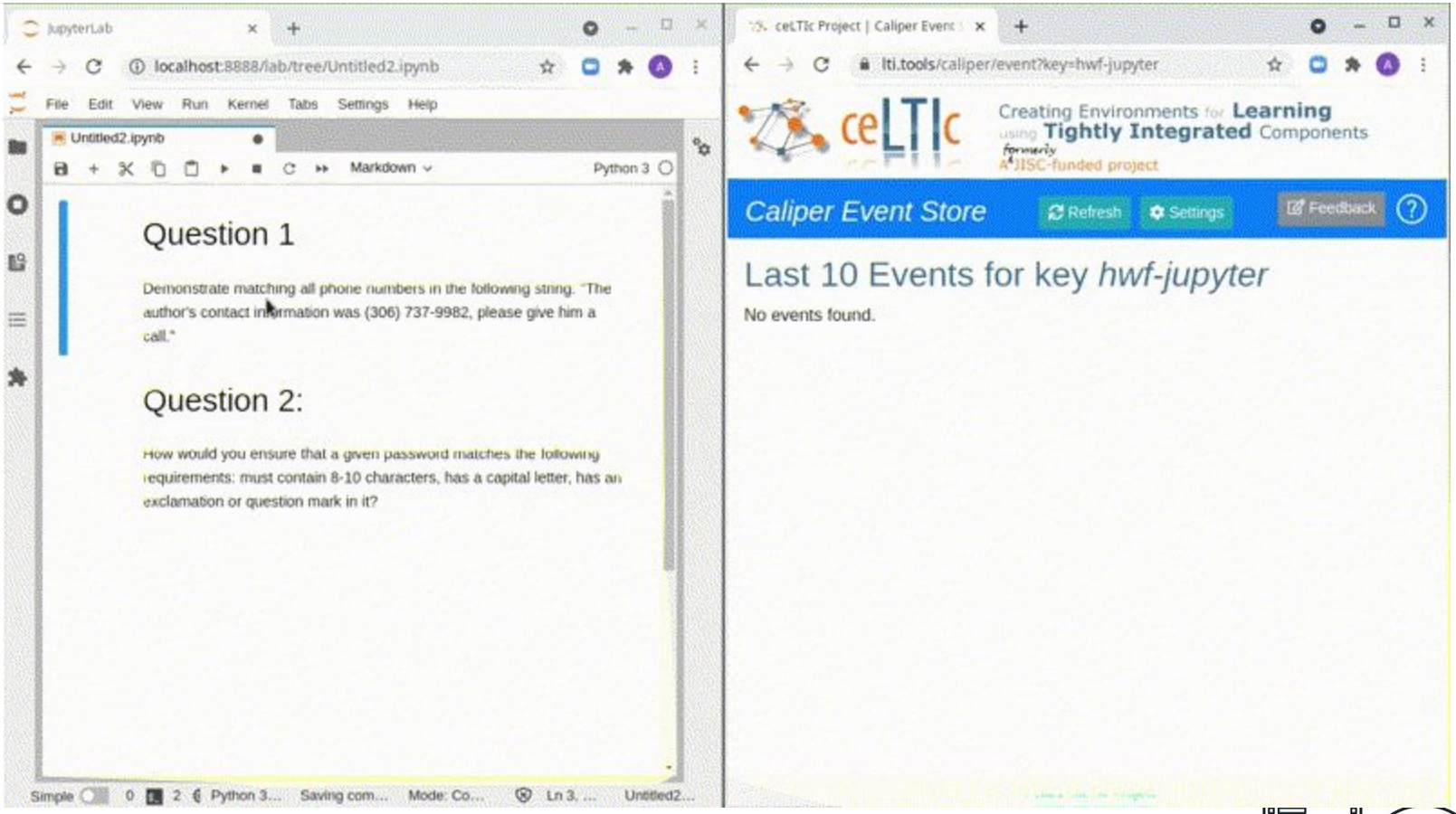
- **Unizin Data Platform** - A collaborative deployment with other institutions in the collective; Platform built on Google Cloud

Vote for Team #16!

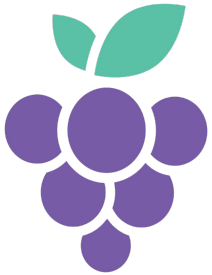
hwf-2021-16@umich.edu

https://github.com/educational-technology-collective/hwf-jupyterlab-telemetry

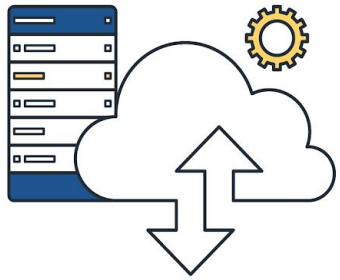



JupyterLab
localhost:8888/lab/tree/Untitled2.ipynb
File Edit View Run Kernel Tabs Settings Help
Untitled2.ipynb
Markdown
Python 3
Question 1
Demonstrate matching all phone numbers in the following string. "The author's contact information was (306) 737-9982, please give him a call."
Question 2:
How would you ensure that a given password matches the following requirements: must contain 8-10 characters, has a capital letter, has an exclamation or question mark in it?
Simple
Python 3...
Saving com...
Mode: Co...
Ln 3, ...
Untitled2...
ceLTIc Project | Caliper Event
lti.tools/caliper/event?key=hwf-jupyter
ceLTIc
Creating Environments for Learning using Tightly Integrated Components
formerly A JISC-funded project
Caliper Event Store
Refresh
Settings
Feedback
Last 10 Events for key hwf-jupyter
No events found.

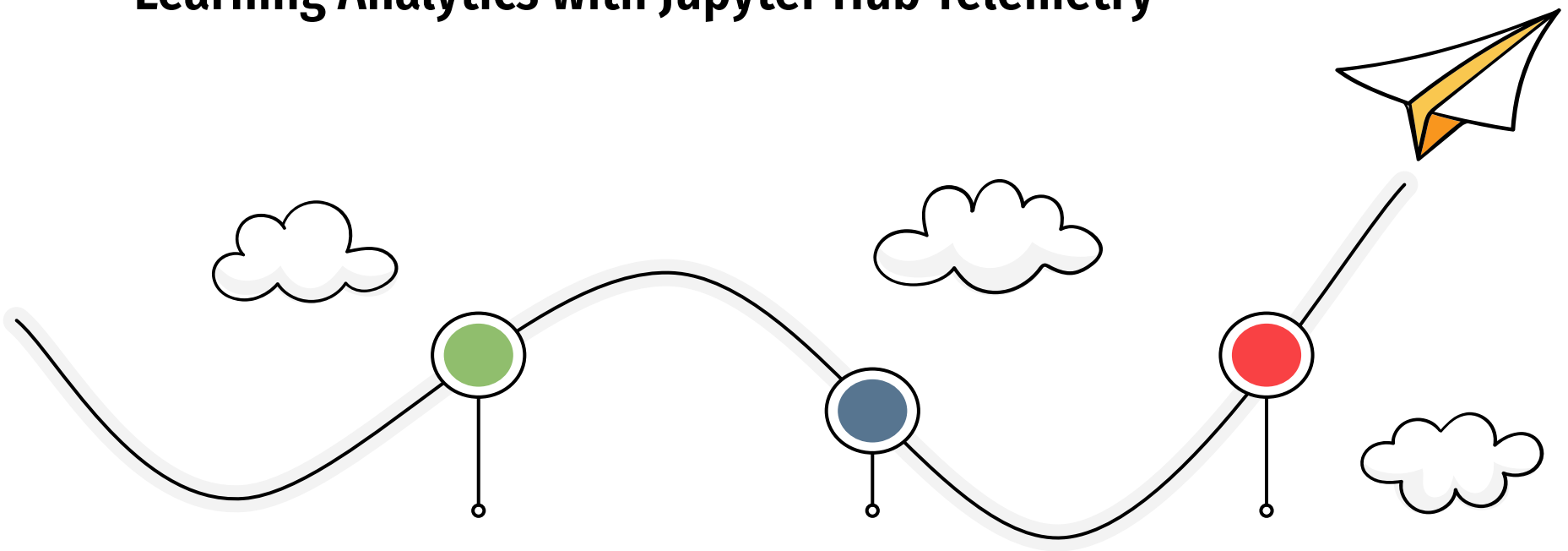
Contributions



- **Jupyter** - Community whose goal is to "develop open-source software, open-standards and services for interactive computing across dozens of programming languages"
- **Jupyter Notebook** - Open-source web application for creating and sharing documents that contain live code, equations, visualizations and text.
- **JupyterLab** - Evolution of Jupyter notebook for working with notebooks code and data
- **JupyterHub** - Multi-user version of Jupyter Notebook
- **Unizin Data Platform (UDP)** - Product that integrates, aggregates, cleans, models and stores all teaching and learning data into a data lake



Learning Analytics with Jupyter Hub Telemetry



Telemetry

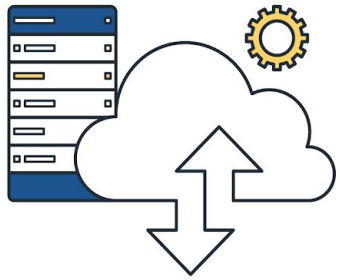
Capture events associated with user learning experiences

Visualization

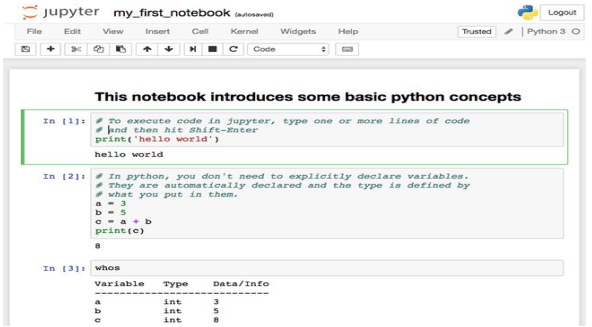
Reconstruct learning process using the telemetry event data

Analytics

Distill business insights into actions to improve student learning



What is a Jupyter learning event?

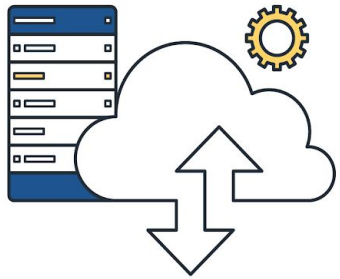


Actor

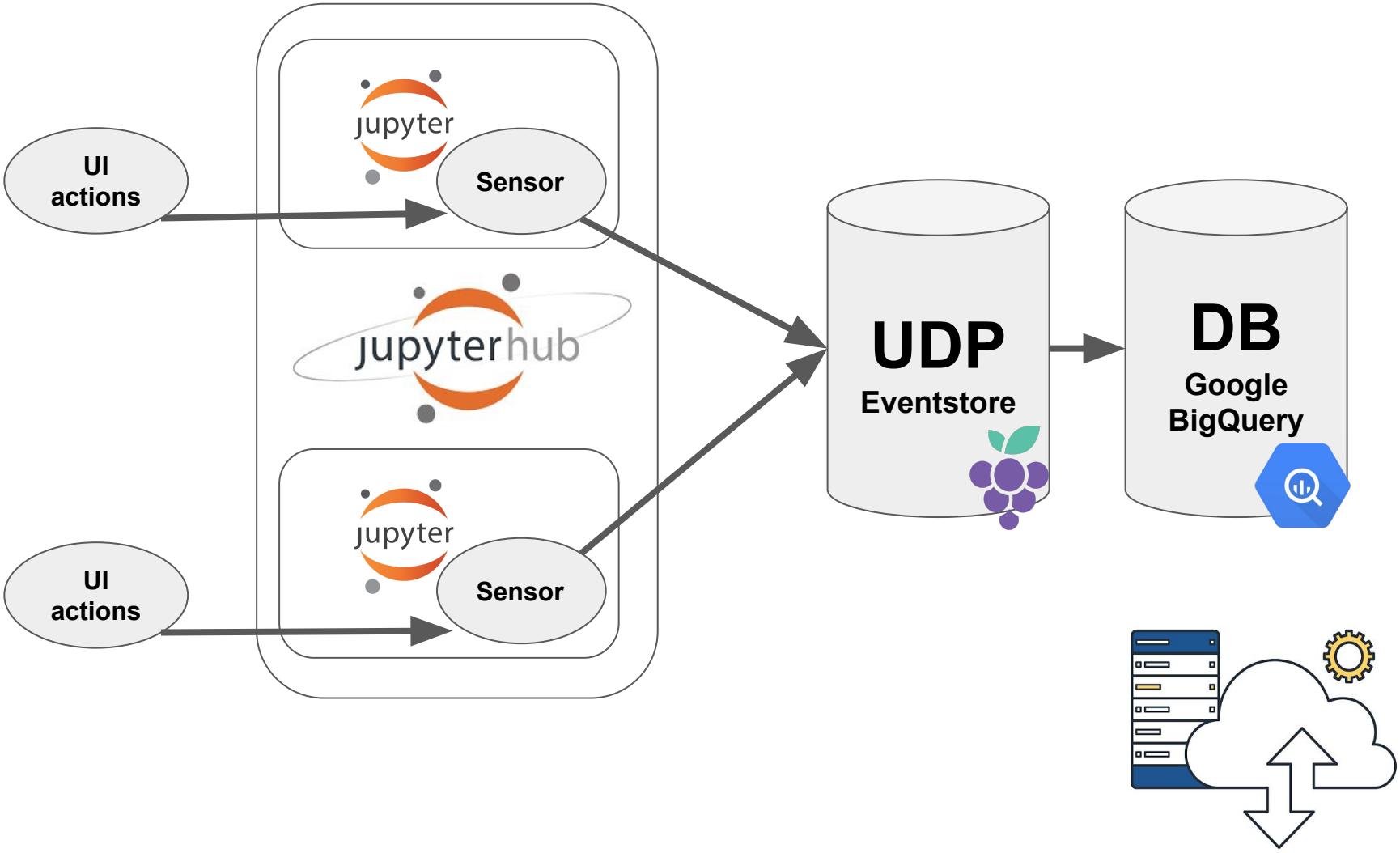
Action

Object

Actor	Action	Object
Bob	Opens	Jupyter Notebook (ID #123)
Alice	Selects cell	Cell #1
Bob	Runs cell	Cell #2 after first time failure

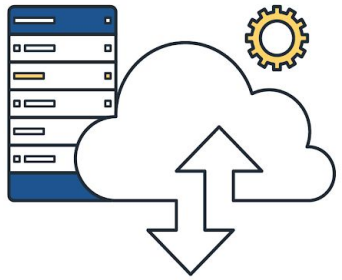


JupyterHub/Caliper sensor/Unizin Data Platform

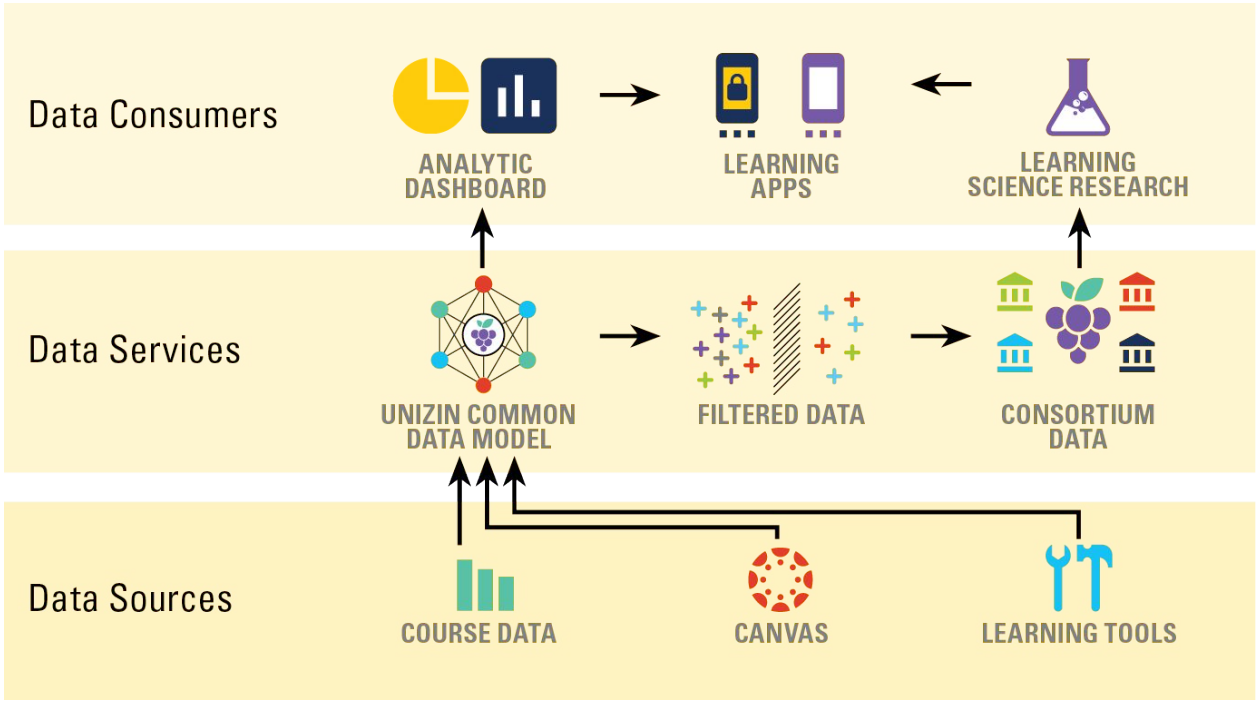


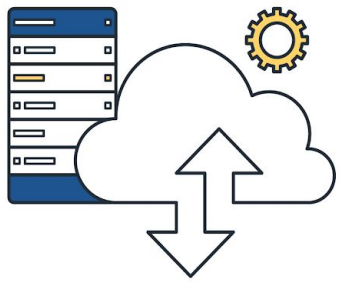
GitHub Repo

- https://github.com/educational-technology-collective/hwf-jupyterlab-telemetry



Unizin Data Platform





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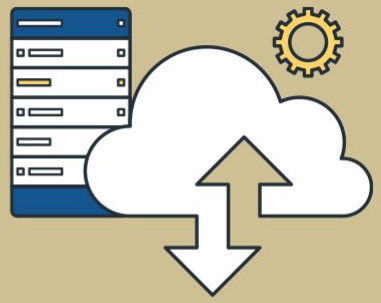

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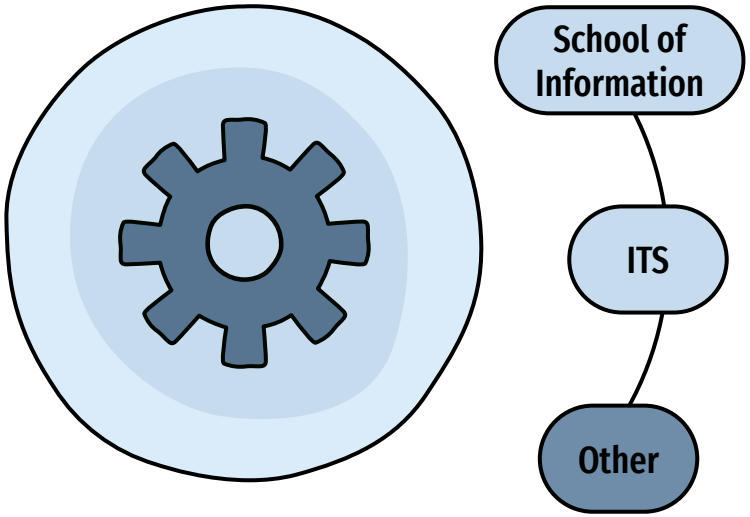
Team 16: Instrumenting Education (10-min demo)



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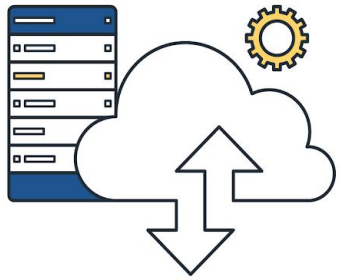

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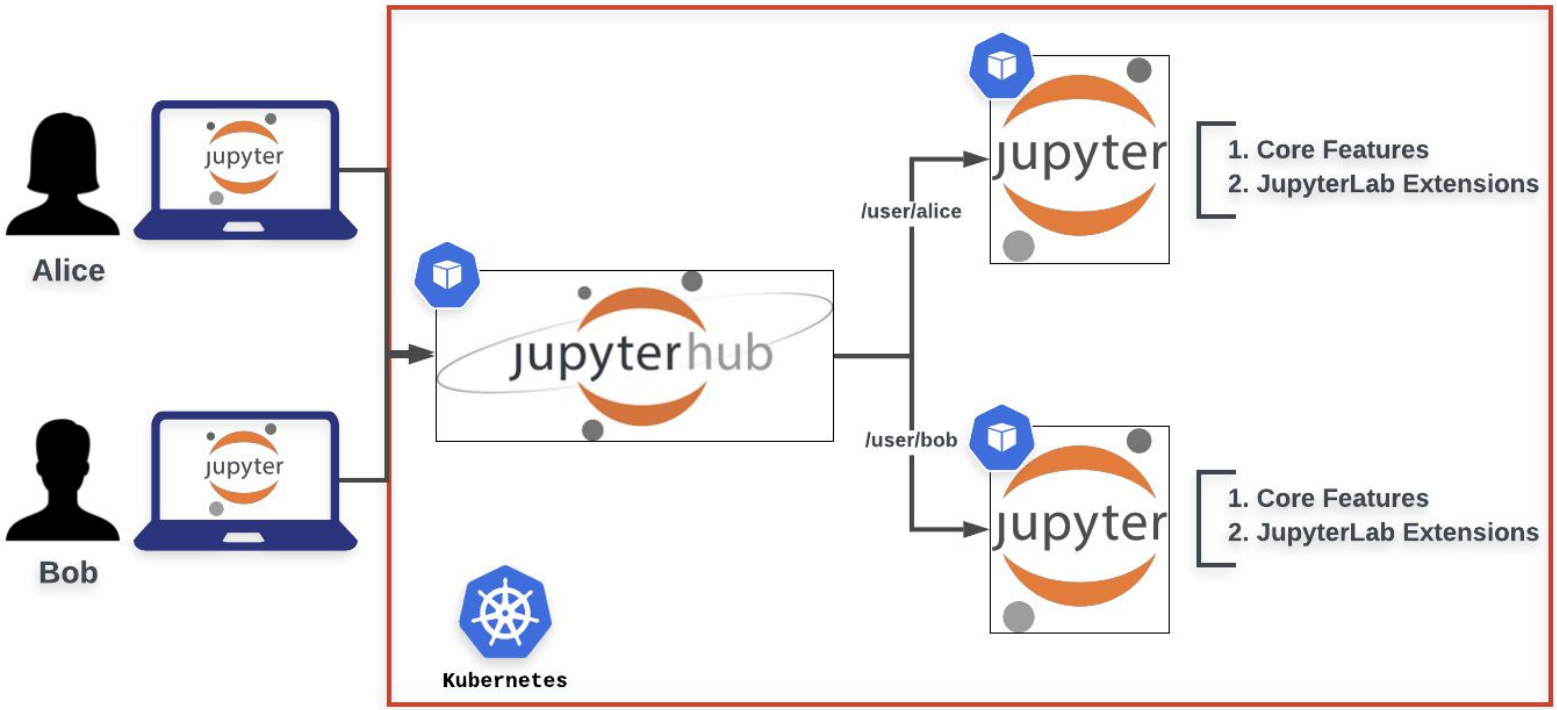

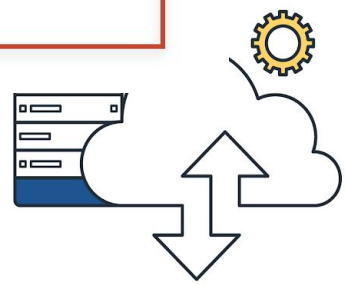

JupyterHub Deployment Architecture. Image from blog.jupyter.org